NEW JERSEY

Contact Information

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New Jersey Department of Environmental Protection (NJDEP) Bureau of Freshwater and Biological Monitoring homepage:
http://www.state.nj.us/dep/watershedmgt/bfbm/

Program Description

River/Stream Benthic Macroinvertebrate Monitoring in the New Jersey Department of Environmental Protection (NJDEP) evaluates aquatic life designated use support in non-tidal rivers and streams. These communities are examined using USEPA's Rapid Bioassessment Protocols - Level II (see USEPA 1989; NJDEP 1992). Using this protocol, communities are examined for pollution tolerant and intolerant forms and the results are used to compute the New Jersey Impairment Score (NJIS). Under this scoring system, the benthic macroinvertebrate population results are used to identify aquatic life designated use support for rivers and streams.

Currently in New Jersey, monitoring occurs in the Ambient Biological Monitoring Network (AMNET) at over 800 locations statewide on a 5-year rotating schedule. Round one sampling was conducted between 1992 and 1996 (inclusive), and Round two between 1997 and 2001 (also inclusive). For the 2000 Water Quality Inventory Report, published assessments for Round two were reported, but were limited to the Upper Delaware Basin as sampled between 1997 and 1998, representing 139 monitoring stations. Round two data collection for the remaining portions of the state was completed in 2001 and final reports are planned to be published during 2002. Published Round two reports will be used in subsequent New Jersey Water Quality Inventory Reports. Readers are referred to the 1996 or 1998 305(b) Reports for the current status of statewide aquatic life assessment results based upon the first round of sampling.

In addition to direct biological assessments, the current round of field work includes a qualitative assessment of stream habitat quality at each monitoring location, the results of which are used to compute a Habitat Assessment Score. Various components of the habitat are examined such as the amount of available cover along the stream bottom, amount of sediment deposition, bank stability, frequency of riffles, presence and amount of riparian vegetative cover, etc. These data are published in concert with the corresponding biological assessments in the Department's AMNET reports.

Documentation and Further Information

2000 Water Quality Inventory Report for New Jersey, 305(b), September 2000:
http://www.state.nj.us/dep/dsr/watershed/305b/305b.htm

2002 303(d) Data Submittal Information: http://www.state.nj.us/dep/dsr/watershed/303D/303d-datasubmittal.htm

DRAFT Integrated Water Quality Monitoring and Assessment Methods (Water Quality Inventory Report - 305b and the Impaired Waterbodies List - 303d), May 2002*:*
http://www.state.nj.us/dep/dsr/watershed/integratedlist/integratedlist-report.pdf

Surface Water Quality Standards, May 1998: http://www.state.nj.us/dep/watershedmgt/swqs/98swqs_web.pdf

The National Environmental Performance Partnership System (NEPPS) Environmental Indicators Technical Report, June 1998: http://www.state.nj.us/dep/dsr/neppspub3.htm#WATER%20RESOURCES%20SECTION

Ambient Biomonitoring Network (AMNET) homepage: http://www.state.nj.us/dep/watershedmgt/bfbm/amnet.html

Fish IBI information: http://www.state.nj.us/dep/watershedmgt/bfbm/fishibi.html

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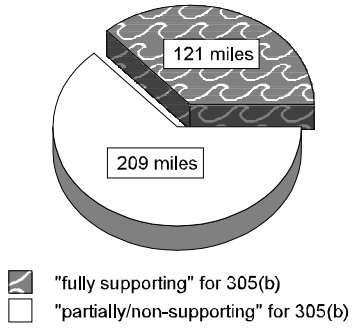
Programmatic Elements

Uses of bioassessment within overall water quality program	✓	problem identification (screening)
		nonpoint source assessments
		monitoring the effectiveness of BMPs
	✓	ALU determinations/ambient monitoring
		promulgated into state water quality standards as biocriteria
		support of antidegradation
	✓	evaluation of discharge permit conditions
	✓	TMDL assessment and monitoring
		other:
Applicable monitoring designs	✓	targeted (i.e., sites selected for specific purpose) *(special projects and specific river basins or watersheds)*
	✓	fixed station (i.e., water quality monitoring stations) *(comprehensive use throughout jurisdiction)*
		probabilistic by stream order/catchment area
		probabilistic by ecoregion, or statewide
	✓	rotating basin *(comprehensive use throughout jurisdiction)*
		other:

Stream Miles

Total miles *(determined using RF3 stream segments)*	**6,500**
Total perennial miles	–
Total miles assessed for biology*	**330**
fully supporting for 305(b)*	121
partially/non-supporting for 305(b)*	209
listed for 303(d)	–
number of sites sampled*	139
number of miles assessed per site*	~2.4

330 Miles Assessed for Biology



*This assessment information, including total miles assessed for biology, 305(b) miles and number of sites sampled, was extracted from New Jersey's 2000 305(b) Report. A new method is being used to determine spatial extent – these results will be available in the upcoming 305(b)/303(d) reports.

Aquatic Life Use (ALU) Designations and Decision-Making

ALU designation basis	not applicable	
ALU designations in state water quality standards	Three designations: trout production, trout maintenance and non-trout.	
Narrative Biocriteria in WQS	none - See EPA Rapid Bioassessment Protocols (impairment scoring criteria) for procedures used to support general aquatic life standard.	
Numeric Biocriteria in WQS	none	
Uses of bioassessment data in integrated assessments with other environmental data (e.g., toxicity testing and chemical specific criteria)		assessment of aquatic resources
	✓	cause and effect determinations
		permitted discharges
	✓	monitoring (e.g., improvements after mitigation)
	✓	watershed based management
Uses of bioassessment/ biocriteria in making management decisions regarding restoration of aquatic resources to a designated ALU	Bioassessments are one of the driving forces behind the TMDL program and 303(d) listing process.	

Reference Site/Condition Development

Number of reference sites	**43 total**	
Reference site determinations		site-specific
		paired watersheds
	✓	regional (aggregate of sites)
	✓	professional judgment
		other:
Reference site criteria	New Jersey uses USEPA's RBP visual habitat assessment protocol. Reference sites are those sites at the upper end of the habitat scale with slight anthropogenic disturbance. Biological criteria includes: a benthic macroinvertebrate community comparable to other relatively undisturbed streams within the region. The community is characterized by maximum taxa richness, balanced taxa groups, and good representation of pollution intolerant taxa.	
Characterization of reference sites within a regional context		historical conditions
	✓	least disturbed sites
		gradient response
		professional judgment
		other:
Stream stratification within regional reference conditions	✓	ecoregions (or some aggregate)
		elevation
		stream type
		multivariate grouping
		jurisdictional (i.e., statewide)
		other:
Additional information		reference sites linked to ALU
		reference sites/condition referenced in water quality standards
	✓	some reference sites represent acceptable human-induced conditions

Field and Lab Methods

Assemblages assessed	✓	benthos *(100-500 samples/year; multiple seasons, multiple sites – broad coverage for watershed level)*
	✓	fish *(<100 samples/year; single season, multiple sites - broad coverage)*
		periphyton
		other:
Benthos		
sampling gear		rectangular kick net (9"x18"); >800 micron mesh
habitat selection		riffle/run (cobble) and multihabitat
subsample size		100 count
taxonomy		family
Fish		
sampling gear		backpack electrofisher, pram unit (tote barge); 3/16" mesh
habitat selection		multihabitat
sample processing		anomalies
subsample		none (American eel numbers are estimated during sampling)
taxonomy		species
Habitat assessments		visual based; performed with bioassessments (for more information, please go to: http://www.state.nj.us/dep/watershedmgt/bfbm/appendix/habitat.html)
Quality assurance program elements		standard operating procedures, quality assurance plan, periodic meetings and training for biologists, taxonomic proficiency checks, specimen archival

Data Analysis and Interpretation

Data analysis tools and methods		summary tables, illustrative graphs
		parametric ANOVAs
		multivariate analysis
	✓	biological metrics *(aggregate metrics into an index)*
		disturbance gradients
		other:
Multimetric thresholds		
transforming metrics into unitless scores		USEPA RBP guidelines (USEPA 1989)
defining impairment in a multimetric index		USEPA RBP guidelines (USEPA 1989)
Evaluation of performance characteristics	✓	repeat sampling *(multiple seasons and reaches)*
		precision
	✓	sensitivity *(statistically related to certain water quality and basin characteristics)*
		bias
	✓	accuracy *(replicate sampling - Coefficient of variance calculated)*
Biological data		
Storage		STORET (not complete yet) and Quattro Pro
Retrieval and analysis		Quattro Pro program used to calculate the multimetric index scores